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Trout Fishing in Gunnison River, in Colorado

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Vol. VIII JUNE, 1927 No. 3

American Cinematographer

FOSTER GOSS, *Editor and General Manager*

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The EDITOR'S LENS ❦ ❦ focused by FOSTER GOSS

THE TWO following interviews set forth interesting opinions from Daniel B. Clark, president of the American Society of Cinematographers, concerning a subject which has been under discussion in this department for the past two months. These interviews appeared in the Studio Section of Exhibitors Herald. The first is as follows:

¶ Pointing to the examples of successful directors who began their motion picture careers as cinematographers, Daniel B. Clark, president of the American Society of Cinematographers, is authority for the statement that new directorial material, within the next several seasons, will be taken largely from the ranks of camera artists.

¶ "It is a matter of common knowledge," Clark states, "as to the eminent directors who accumulated their motion picture training as cinematographers. These men have made some of the best pictures in the business. Since they broke the directorial barrier, the calling of the cinematographer has become more expert and inclusive than ever before, until today the ace cinematographer is one of the most highly and completely trained artists in the film studios.

¶ "These cinematographers have had every opportunity to observe, study and absorb all that is best in direction and the handling of players. This training, coupled with the fact that they are steeped in the knowledge of the life's heart of picture making—the camera—provides one of the most ideal training grounds imaginable for a director. This being true, the cinematographer, in this day of emphasis on camera effects and singular treatments of cinematography, is more than ever before logical directorial material.

¶ "Then we must also consider," the A. S. C. president continued, "that among the cinematographers you will find, in the point of continuous production service, the real veterans of the film studios. There are men who have been at the camera for fifteen years or longer; and, as in the early days, are still at the top of their profession. These men have worked along with the best directors and players of each of the various periods in cinema history, and there is little in film technique over which they do not possess complete mastery.

¶ "Of course," Clark conceded, "there are many production executives, who regard their cinematographers as being so valuable to their organization in their capacities at the camera, that they hesitate to give them the merited advance to the director's chair—but past experience proves that, no matter how great these men have been as cinematographers, they surpass even their former prestige once they take the natural step to direction.

¶ "Offhand," Clark concluded, "I can name several cinematographers who have it within their make-up to become sensations as directors, if their companies will only give them the opportunity—which I am sure must be soon forthcoming. Producers realize now, more than ever before, that American cinematographers are the most able in the world. As Jesse L. Lasky pointed out recently in a national fan magazine, countless foreign directors have been brought to American studios, but not one cinematographer has been imported from beyond the Atlantic. In fact, most foreign directors appear to be eager for the privilege to work with an American cinematographer because our cinematographers have the ability to express their unique ideas of story treatment! So you can easily see that the time is ripe to recruit the new directors from among the cinematographers."

¶ *The second interview follows:*

¶ Will the director of today be the director-cinematographer of the future in motion picture production?

¶ This novel query is propounded by Daniel B. Clark, president of the American Society of Cinematographers, in a discussion of things cinematographic in the film industry.

¶ "In the past," Clark states, "the motion picture director was chiefly a hold-over from the stage where he held a similar post as a 'stage director.' The more recent and more successful directors have been those who were not previously prepared with legitimate experience, but who acquired their picture knowledge within the confines of the industry. With the coming of these men, the cinema, as a self-contained art that is not subservient to the stage, began to assert itself. These newer directors have been successful in the degree in which they viewed their productions through the medium of the camera, rather than from the perspective of circumscribed stage limitations.

¶ "While the camera," the A. S C. president explained, "may have gained 'self-consciousness' in

(Continued on Page 21)

Film Care in the Tropics

By Herford Tynes Cowling, A. S. C.*

Packing, Sealing and Preparing for Shipping Among Precautious to Keep Film

THIS paper describes the use and care of motion picture negative film to be exposed in tropical countries and far away from the home laboratory.

The immediate action of light on sensitive film is the production of a latent image and an invisible picture which can only be made apparent by the process of development. With modern materials the operator knows that a certain exposure in a certain light with the appropriate lens aperture will produce a definitely predictable amount of latent image which when developed, either today or tomorrow or next week will yield a picture of equally predictable intensity. He can rely on the latent image enduring unchanged until he wishes to secure its development.

It is a little realized fact, perhaps, that under abnormal conditions of heat and moisture, especially in those hot countries where bacteria and fungoid moulds abound, the latent image is not quite so permanent as we are wont to believe. Little by little as each week passes in the traveler's journey towards home, the latent image may become weaker until by the time the film reaches the laboratory only a very feeble picture can be revealed by development.

Fading

My own personal experiences in tropical countries, especially during the humid rainy seasons, has shown me that there is generally a pronounced fading of the latent image together with much general fog on development unless certain definite rules are followed. I have found it advisable to treat the problem from two angles. Firstly, it is wise to increase the camera exposure so that there is more latent image to withstand fading; secondly, a scheme of packing must be employed which insures protection against these harmful atmospheric conditions. By adhering to a few common sense rules I have found it quite feasible to keep negative film up to a maximum of nine months between the exposure and the development. One lot of 3,000 feet exposed in Sumatra, under the gruelling heat of the equator, did not arrive home till ten months later, but owing to judgment in exposure and care in packing there was very little which was not of excellent quality.

We may divide the life of a negative film into four periods; that which elapses:

(1) Before opening the sealed unit which comes from the manufacturer.

(2) Between opening the unit and placing the film in the camera.

(3) While the film is in the camera.

(4) Between exposure and development

*Eastman Kodak Co., Rochester, N. Y.

Paper presented before the Society of Motion Picture Engineers, Norfolk, Va.

Care in Shipping and Before Opening the Original Container

NEGATIVE film is comparatively safe from decay whilst resting in the original metal container in which it comes from the manufacturer. When once this has been opened, even though it be immediately resealed with tape, moisture and bacteria have been admitted and the film's future history becomes a matter of doubt. Experienced travellers and explorers adopt a unit system of packing and avoid opening any of the film as originally packed until required for use. Among the items to be specified when the negative film is ordered from the manufacturer the following are important:

1. Type of camera in use.

2. Length of rolls required.

3. Method of winding peculiar to the particular camera in use.

4. Kind of negative desired (par-speed, super-speed, or panchromatic.)

5. Size of unit packing desired.

6. Number of rolls of adhesive tape and black paper required.

The unit system of packing employs a series of three containers, each larger unit containing a number of smaller, considering these from the inside outwards:

First unit: Should hold the length taken by the camera, whether 50-100-200 or 400 ft. rolls, sealed double taped original metal containers by the manufacturer.

Second unit: Should comprise five first unit rolls placed in a larger metal container and hermetically sealed with a very thin sheet of soft metal to allow for opening with a pocket knife. An additional double taped cover should be provided so that the second unit can be used for repacking the first units after exposure.

Third unit: Metal lined wooden shipping case containing four to six second units. The sealed metal lining can be taken out of the wooden shipping case and put into fiber cases or other carriers for local transport without opening the metal. Maximum weight, not including wooden shipping case is forty pounds.

A supply of one-inch width adhesive tape rolls sufficient to double tape all first and second units after use, also new black photographic wrapping paper in a sealed roll sufficient to rewrap the film, should be included in this unit.

The larger unit may also be used to pack other photographic supplies used on the trip, including plates, film rolls, etc., and which may also be wanted on the unit system. Photographic supplies should be kept separate from any unit containing other supplies.

Cool, Dry Place

Shipments to agents or representatives in foreign coun-

(Continued on Page 13)

Amateur Cinematography

A Professional's Notes for Amateurs

Part VIII
By Jos. A. Dubray, A. S. C.

Lenses, Photographic Objects, Refracting Surfaces Are Discussed This Month

(Continued From Last Month)

Jos. A. Dubray

Prior to entering into a discussion of photographic lenses, a definite distinction must be made between a *lens* and a photographic *objective*.

A photographic objective, which is commonly and erroneously called a lens, is in fact (except for very few exceptions) a *combination of lenses* assembled for specific purposes; while a *lens* is merely one of the elements forming the objective.

In other words, a *lens* is a single piece of transparent material, of homogenous composition, cut and ground in such shape as to present two refracting surfaces, and several lenses combined together, form the optical instrument called an *objective*.

Refracting Surfaces

THE refracting surfaces of lenses used in the making of photographic objectives may be *both spherical*, or *one* may be *spherical* while the other may be plane.

This limitation of form gives rise to *six* different shapes of lenses, which in turn can be divided into two categories.

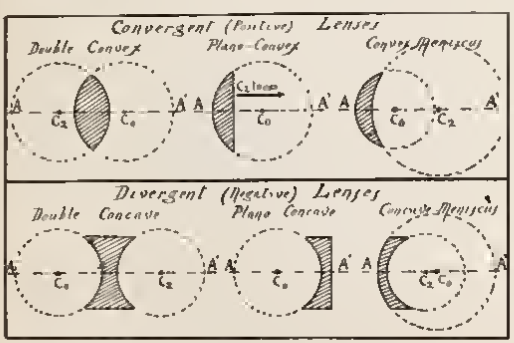

Figure 17

The *curved* surface of each one of these lenses is a portion of a sphere, having a well defined radius length.

The *plane* surfaces may be considered as surfaces of sphere, whose radius extends to *infinity*.

The graphic representation in the figure represents the section of the lenses—the shaded area indicating the body of the lens; the full lines giving the boundaries, and the dotted lines giving the remaining circumference of the sphere of which the lens is a part.

The C points in the figure represent the centers of the spheres, and are called *centers of curvature*. The sign C is always used for indicating such points, and are distinguished by suffixes in order to indicate to which refracting surface they belong.

In the figure, for instance, the points C_0 pertain to the first surface of the lens and the points C_2 pertain to the second surface.

The line A A′, which passes through *both* centers of curvature, in the case in which both surfaces are spherical, and which passes through the center of the curved surface and is perpendicular to the plane one, as in the case of plano-convex and plane-concave lenses, is called the *axis of the lens*.

The face of the lens that is turned *toward* the incident light, is called the *first face of the lens* and consequently the *second face* is the one that is turned from the incident light.

The points of intersection of the axis and the two faces are called the *vertices* of the lens and are denoted by the symbol V, distinguished by suffixes as in the case of the symbols indicating the centers of curvature.

The *radii* of the curved surfaces, or distances between the center of curvature and any point of its surface, are represented by the small italic letter *r*.

Finally the distance between the two vertices of a lens gives the *thickness* of the lens and is represented by the small italic letter *d*.

On First Surface

LET us now consider the behavior of a ray of monochromatic light incident upon any point of the first surface of a lens, and let us follow its path through the lens, and at its emergence from the second face of the lens, and let this lens be a double convex made of *glass*, n=1.5; and let it be surrounded by *air*.

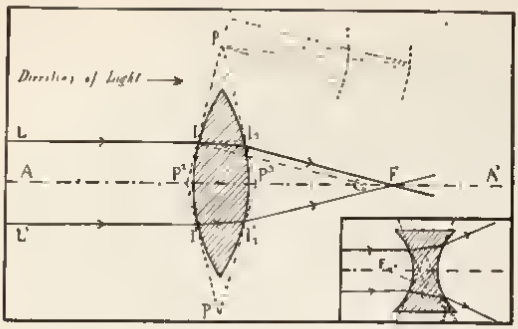

Figure 18

Each surface of the lens may be considered as *composed by an infinite number of plane elements,* and each one of these elements may be supposed to have the same magnitude as an infinitely small bundle of rays, so infinitely small that it may be considered a *single ray* and may be represented on the plane of the paper, by a straight line.

Let the incident ray be the ray L I in Fig 18 and let it strike the first surface of the lens at the point, or *element* I. The *normal* to the surface at this point is the perpendicular to the *tangent* P P² which touches the first surface at the point I.

It is a geometrical principle that the perpendicular to a line tangent to any point of the surface of a sphere represents also the *radius* of the sphere. I C_0 is then the radius r_0, and the perpendicular to the infinitely small surface I.

Let us now draw the tangent to the second surface of the lens, at the point I_1, and let I I_1 be parallel to the axis A A'.

It is clear from the figure, that the triangle P P² P³, may be considered as representing the section of a *prism,* and we can easily trace, geometrically, the approximate path of the refracted ray into the medium of the lens and at its emergence from it. (See the February issue of the American Cinematographer, Fig. 12.)

It is evident from the figure that the emergent ray shall meet the *axis,* at a certain point, which will be determined by the *curvature of the surfaces* of the lens and by the *composition* or *n* (Index of Refraction) value of the lens itself.

If we consider now another ray L' I' incident to the first surface *below* the axis and we follow the same geometrical construction as for the ray L I, we find that the prism P² P' P³ is similar to the prism P P² P³, but reversed; and the emergent ray will meet the axis at the point F, or at the *same point* that was created by the meeting with the axis of the refracted ray R F. The rays *converge* to the same point, and the lens in question is then called a *convergent lens.*

If similiar geometrical constructions are drawn for the plano-convex and convex meniscus lenses (Fig. 17) we see that after refraction, all rays passing through these types of lenses *converge* towards the axis. These types of lenses are then called *convergent.*

A simple glimpse at Fig. 18a will show that in this type of lens (double concave), the refracted rays, at their exit from the lens, *diverge* from the axis, and only their imaginary prolongation will meet the axis at the point F', which is situated *in front* of the lens.

The rays refracted by the plano-concave and concave-meniscus lenses (Fig. 17), also *diverge* from the axis and these types of lenses are therefore called *divergent.*

Specifications

IT CAN easily be understood that any lens may be perfectly defined by its specifications, namely: I: The composition of the medium of which it is made i.e. its *n* value or index of refraction; II: By its shape and dimension.

It would be very tedious and it would require unnecessary time and space to call each point, each distance and each angle pertaining to a lens, by its specific name. Hence the need of having recourse to conventional symbols and signs, which, once chosen, shall always refer to the same characteristics of lenses, and which can, at a glance and unmistakably, be referred to such characteristic.

The small italic letter *r,* for instance, shall always refer to the radius of the sphere of which the surface of the lens is part; in like manner, the capital letter C, shall always refer to the position of the center of curvature and so forth.

Although, in later years, a strong tendency has been evident to bring these symbols and signs to uniformity, they are quite arbitrarily used in different countries and also by different physicists. In the course of this study, we will follow the convention adopted by Dr. Adolph Steinheil and expounded (save error) by Dr. Von Rohr.

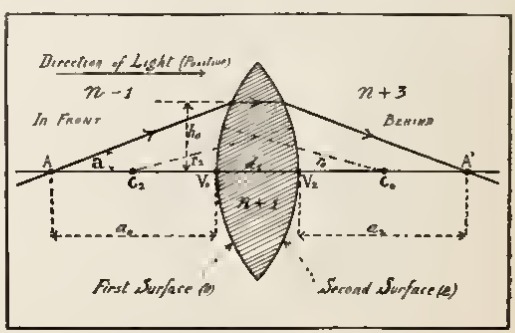

Figure 19

Figure 19 represents a double-convex lens, and a ray of light, incident to the first surface, refracted into the me-

(Continued on Page 15)

Graininess of Motion Picture Film

By J. I. Crabtree

First Installment Cites Factors of Graininess During Exposure and Development

From the Research Laboratory of the Eastman Kodak Company. Presented at the spring convention of the S. M. P. E., Norfolk, Va., 1927.

WHEN a motion picture is viewed at a relatively short distance from the screen the various tones of the image are seen to consist of an agglomeration of small particles which appear to be in a state of boiling or scintillation. This lack of homogeniety of the tones of the picture is known as graininess, and for a given image is more apparent the greater the degree of enlargement and the shorter the distance of the observer from the screen.

The non-homogeniety of the image is due to the fact that a photographic emulsion is composed of small grains of silver halide which on development are changed to grains of metallic silver (see Fig. 1). During manufacture the individual grains in the emulsion tend to congregate in clusters and the silver grains which are visible on the screen consist of such developed clusters. The individual grains of even the coarsest grained emulsions are too small to be visible on the screen.

The apparent boiling effect is due to slight differences in position of the grain clusters as the single frame pictures are projected in rapid succession.

The word graininess is applied both to an undeveloped emulsion and the developed image. An emulsion may have inherent graininess due to the relatively large size of the grains and grain clusters, but the effect of this is only manifest in the developed image. Also, since the screen image is obtained by projection of a positive image which is usually prepared from a fine grained emulsion, it is of interest to study the extent to which the graininess of the negative image is recorded by the positive.

Previous to the investigations of Jones and Deisch[1] and Jones and Hardy,[2] little or no information was available regarding the factors which controlled the graininess of a developed image produced from a given emulsion. Motion picture workers were aware that different scenes from the same roll of film often showed varying degrees of graininess for no apparent reason. It is now possible to explain why this occurs and to indicate some of the conditions which tend to reduce graininess to a minimum.

Factors Affecting Graininess During Exposure and Development

In their investigations Jones and Hardy[2] measured the graininess of areas of uniform density obtained by varying the exposure and processing conditions. Their experiments were made by viewing their findings by preparing continuous lengths of motion picture film under practical working conditions and viewing the results on the screen.

It has been found that graininess is governed by the following factors:

1. *The Density of the Silver Deposit.*

Under any given conditions and with all emulsions the graininess of a silver deposit increases as the density increases up to a maximum at a density of about 0.3 and beyond this graininess decreases. This is as might be expected since a density of 0.3 transmits 50% of the incident light. If a series of parallel lines are ruled on a strip of film, on looking through the film the lines can be seen at the greatest distance when the width of the lines is equal to the space between. From this it is obvious that the various tones in the screen picture will exhibit varying degrees of graininess according to their density. Graininess is always most visible in the lighter tones such as the face and in a uniform area of relatively low density. It is possible therefore to diminish graininess by avoiding large uniform areas whenever possible and when arranging a set by choosing backgrounds which will not render as densities around 0.3 in the final print. This, however, is not a practical solution of the problem.

2. *The Nature of the Emulsion.*

In general, graininess tends to increase with the speed of the emulsion used but this is not an invariable rule, because the inherent graininess of present day high speed emulsions is gradually being diminished by manufacturers without loss of speed. A perfectly grainless medium, however, whose sensitivity to light is of the same order as the present negative motion picture film has still to be made.

There are many occasions when an extremely fine grained material such as positive motion picture film can be used successfully for making negatives such as slide film negatives.[3] Owing to the shorter latitude of this film in comparison with negative motion picture film, the exposure must be more critical and a soft-working developer is necessary to avoid excessive contrast.

3. *The Exposure.*

The experiments of Jones and Hardy[2] indicated that for a given subject and a constant degree of development

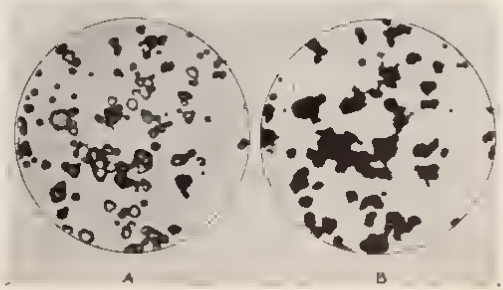

Figure 1

of both negative and positive, the graininess of the positive increased as the camera exposure of the negative was increased. However, projection tests with matched positive prints made from negatives exposed on the same subject at f/11 and f/3.5 and developed for the same time, showed little or no difference in graininess of the prints.

The effect of exposure is dealt with a further length below.

4. *The Time Which Elapses Between Exposure and Development.*

If negative motion picture film with nitrate base is stored after exposure at relatively high temperatures (80°F. or higher) in the presence of moisture, there is a tendency for the latent image to fade, that is, after development the density of the various tones will be less than if the film was developed immediately after exposure..[4]

Experience has shown that negatives returned for development by explorers invariably show excessive graininess whenever any considerable degree of fading of the latent image has occurred. The precise reason for this has not been investigated.

It is advisable therefore to develop film as soon as possible after exposure, but if this is not practical the access of moist air should be prevented because little or no fading occurs even at high temperatures in the absence of moisture. Precautions for handling film after exposure in order to prevent fading of the latent image have been published by the author.[4]

5. *The Nature of the Developer.*

a. The composition of the developing solution. Jones and Hardy[2] observed that little difference in graininess was produced by the developing solutions in common use. Repeated projection tests have shown that for all practical purposes this observation is true. J. G. Capstaff of this laboratory has recently found, however, that a developer with a high sulphite and low alkali content gives negatives of negligible graininess in comparison with that of negatives developed in the commonly used developers. The formula of this developer is given later in this paper. Although this developer contains elon and hydroquinone as the reducing agents, other developing agents may be substituted without affecting its ability to produce fine-grained deposits. The borax merely functions as a weak alkali.

The ability of the developer to produce fine-grained deposits is due undoubtedly to the solvent action of the sulphite on the silver halide emulsion. This not only reduces the size of each individual grain, but serves to prevent clustering or fusion during development of grains which are in close proximity to each other. The reason ofr this is obvious from a study of Fig. 1. Fig. 1A shows a cluster of silver halide grains before development and Fig. 1B the same grains after development. The fusion or overlapping of adjacent grains is clearly shown. Obviously, if the size of each grain is reduced during development by virtue of the solvent action of the sulphite the distance between the surfaces of two adjacent grains is increased and the possibility of fusion is reduced.

The solvent action of the sulphite on the emulsion is revealed by the fact that the developer turns milky with use, due to the presence of colloidal silver in suspension, while the walls of the developer tank become plated with metallic silver. Neither the presence of colloidal silver nor the plating out effect has any harmful effect on the developing solution.

Even with the higher speed emulsions, the graininess of negatives developed with this developer is of such a low order that it is necessary to stand quite close to the screen in order to detect any graininess in the picture whatsoever. Moreover, the improved sharpness of the positive picture resulting from the reduced graininess of the negative greatly improves its general photographic quality.

b. Dilution of the developer. Jones and Hardy[2] showed that contrary to popular belief, dilution of a developer tends to increase graininess slightly when developing to a given contrast. This is undoubtedly a result of the diminished solvent action of the sulphite on the silver grains which takes place to some extent in most developing solutions.[5] Dilution of the borax developer above has the effect of increasing the graininess. It should be used in the concentration given.

6. *The Degree of Development.*

During development, at a constant temperature contrast or gamma increases with time of development until a certain limit is reached. The contrast of the image at any moment compared with the limiting contrast which is possible is a measure of the degree of development at that instant.

It has been shown experimentally that development of any particular grain of an exposed emulsion starts at a point or points within or on the surface of the grain, and as development proceeds these specks of silver grow until the whole grain is reduced to silver.[6] It is obvious, therefore, that if development is arrested at an early stage, only relatively small silver particles remain after removing the residual unexposed emulsion in the fixing bath; whereas if development is carried nearer to completion the size of the developed silver grains is of the same order as that of the original grains.

Since the visibility of the grains and grain clusters, which in turn determines graininess, is proportional to their size, it is apparent that a developed image of any given density obtained in one case by full exposure and low degree of development will in general be composed of smaller grains than one which received a short exposure and a full degree of development.

Projection tests with flashed motion picture film obtained by varying the exposure and degree of development have confirmed this theory.

In practice, however, the degree to which a negative is developed is governed largely by the brightness contrast of the subject. In the case of negative motion picture film the various scenes are developed for a sufficient length of time to produce a definite density contrast or difference in density between the highlights and shadows, although the particular density contrast to be taken as standard is a matter of personal choice. It is obvious, therefore, that negatives of standard density contrast with

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Cleaning Liquids for Motion Picture Film

By J. I. Crabtree and H. C. Carlton

Effects of Various Formulae for Cleaning and Moistening Cited in Last Number

(Continued from Last Month)

IT IS possible to incorporate a mineral oil solvent such as carbon tetrachloride with any of the above alcohol-water mixtures. The quantity of carbon tetrachloride which can be added depends on the quantity of water present in the alcohol. For example: tertiary butyl alcohol and carbon tetrachloride and water and tertiary butyl alcohol are miscible in all proportions. Water and tetrachloride are immiscible, but if water is gradually added to a mixture of the alcohol and carbon tetrachloride with shaking, a uniform mixture is obtained until a critical quantity of water has been added, beyond which the mixture turns milky and the liquid separates on standing into two phases or separate layers. The quantity of water which a given mixture of the alcohol and carbon tetrachloride will hold depends on the alcohol content and on the temperature, the mixture holding less water at lower temperatures.

A curve showing the limiting quantity of water which can be added to mixtures of tertiary butyl alcohol and carbon tetrachloride in varying proportions is given in Figure 1. Commercial samples of the alcohol are apt to contain varying quantities of water. The data are for a practical grade of tertiary butyl alcohol which was practically anhydrous.

The miscibility curves for grain alcohol, denatured alcohol, isopropyl alcohol, and tertiary butyl alcohol are approximately identical for all practical purposes. For the preliminary experiments the following formula was used as a cleaner:

Water	15 parts by volume
Carbon tetrachloride	20 parts by volume
Alcohol to make	100 parts by volume

Of the cleaning liquids prepared according to the above formula the one containing denatured or grain alcohol had little or no solvent properties for mineral oil so that it had no advantages over a plain alcohol-water mixture. When prepared with isopropyl alcohol the mixture dissolved 1% of light machine oil and with tertiary butyl alcohol about 3% of oil. Since the quantity of oil on dirty film is never such that the concentration of oil in the cleaning fluid would exceed this, the isopropyl and tertiary butyl mixtures were considered promising.

In order to determine the effect of the above mixtures on the film, strips of safety and nitrate motion picture film with plain and tinted bases were immersed in glass bottles containing the various liquids and stored for several days at 70°F. The results obtained were as follows:

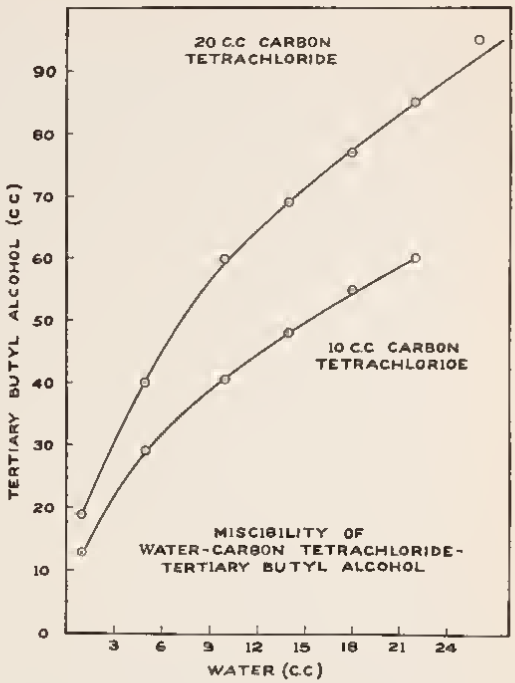


Fig. 1

Photomicrographs of emulsion before and after development. * * *

Effect of Cleaning and Moistening Liquids on Motion Picture Film at 70°F.

Formula	Effect on Film Base	Effect on Gelatin Coating and Image	Effect on Tinted Base
Water 15cc CCl-4 20cc Isopropyl alcohol to 100cc	Acetate Slight curl Nitrate Slight curl in 20 hours	Changed silver image to white silver chloride in 20 hours	Slight solvent action in 5 minutes
Water 20cc CCl-4 10cc CCl Ter btyl alcohol to 100cc	Acetate Slight curl in 20 hours Nitrate No effect in 20 hours	No effect on image	Acetate Slight solvent action in 20 minutes Nitrate No effect in 60 minutes

In the case of the isopropyl alcohol mixtures an interaction between the alcohol or possibly an oxidation product of this and the tetrachloride occurred, causing the liberation of hydrogen chloride which attacked the silver image, converting it to silver chloride. Although neither isopropyl alcohol nor carbon tetrachloride when used alone attacked the silver image, on mixing the two in the presence of water and adding a little silver nitrate solution, a white precipitate of silver chloride formed within a period of a few minutes. No such action occurred with tertiary butyl alcohol.

The interaction of the alcohols with carbon tetrachloglycerine and ethylene glycol and mixtures of these to the

(Continued on Page 17)

In Camerafornia . . .

and News Notes of the Month

JOHN W. BOYLE, A. S. C., has returned to Hollywood from Louisville, Lexington, and other points in Kentucky and the Bluegrass where he went to photograph the Kentucky Derby and other races for Metro-Goldwyn-Mayer.

"Topsy and Eva," on which, starring the Duncan sisters, Boyle was chief cinematographer, will be given its premiere at Grauman's Egyptian, Hollywood, this month.

* * *

Robert B. Kurrle, A. S. C., will be chief cinematographer on Edwin Carewe's production of "Ramona," starring Dolores Del Rio. Kurrle was chief cinematographer on Carewe's "Resurrection."

* * *

E. Burton Steene, A. S. C., made another trip to San Antonio, Texas, during the past month to photograph Akeley scenes of air maneuvers for Metro-Goldwyn-Mayer.

While in San Antonio, Steene attended, with Lucien Hubbard, production supervisor, and William Wellman, director, the world premiere of "Wings," for which Steene executed many Akeley shots in a previous trip to San Antonio.

During the past month also, Steene spent five days in Pico canyon doing Akeley work for the F. B. O. studios.

* * *

Nicholas Musuraca, A. S. C., has signed a contract with F. B. O., which studio will have the benefit of his camera abilities in the future. Musuraca has been chief cinematographer on several F. B. O. productions of late, and the excellence of his work won the permanent arrangement with the studio.

* * *

Charles G. Clarke, A. S. C., will hold forth henceforth at the Warner Bros. studio as a cinematographer, having just signed a contract with that organization.

* * *

Ernest Haller, A. S. C., is coming in for his share of praise for his cinematography in Robert Kane's First National production, "Convoy," which is being given its initial engagement in the east.

Walter Lundin, A. S. C., is preparing for the filming of the next Harold Lloyd production, many scenes of which, it is said, will be taken in New York city.

* * *

Fred A. Parrish, A. S. C., was in Hollywood last month en route to Colorado Springs, where he is returning following a cinematographic expedition to the South Seas.

* * *

Charles Van Enger, A. S. C., is photographing First National's "The Road to Romance," featuring Jack Mulhall and Dorothy Mackaill, with John Francis Dillon directing.

* * *

Charles Rosher, A. S. C., is at work on Mary Pickford's production at the United Artists' studio.

* * *

H. Lyman Broening, A. S. C., has gone East on the special motion picture train to the Shrine convention in Atlantic City to photograph events of the trip and the assemblage.

* * *

Daniel B. Clark, A. S. C., is in Prescott, Arizona, for location scenes for the latest Tom Mix production.

* * *

L. William O'Connell, A. S. C., is photographing Fox's "Prize Fazil," directed by Howard Hawks, and featuring Charles Farrell and Creta Nisson.

* * *

Reginald Lyons, A. S. C., is shooting Buck Jones in "The Broken Dollar" for Fox. Reggie, before beginning the feature, spent a fortnight's vacation in San Francisco.

* * *

John F. Seitz, A. S. C., is in the midst of the filming of Metro-Goldwyn-Mayer's "The Trail of '98." Clarence Brown is directing.

* * *

E. B. Du Par, A. S. C., is chief cinematographer on Warner Brothers' Vitaphone production of "The Jazz Singer," starring Al Jolson.

FILM CARE IN TROPICS

(Continued from Page 6)

tries should be accompanied by strict instructions to store in a cool, dry place. In this connection it is advisable to call attention to the fact that the medium of transportation known as *Express* in the United States is peculiar to the United States and Canada alone and does not exist in other countries. Consequently goods shipped by *Express* from the United States becomes freight at the port of embarkation and moves as freight upon arrival in and during railway transit through any foreign country, and freight moves extremely slowly. The terms "Goods" is used instead of freight abroad. This is very important when shipping perishable goods.

The best way to supply film for an expedition is to have it shipped to the nearest shipping point by the manufacturer well in advance of need. Otherwise take it as baggage, though there are some complications and important things to know about the latter.

Custom Duty

All film is subject to custom duty charges in every country and custom officers are not everywhere familiar with the sensitive nature of film, resulting in their often opening a few cans to determine the nature of the goods. Also nearly all steamship regulations require that all films go as deck cargo and prohibit their presence in the baggage room or cabins. The best place for cases of film on a steamer, if prohibited in the cabin, is in some sheltered position on the deck where it can be kept cool and dry. It is inadvisable to store film near the engine room where it will be subject to heat and violent vibrations, nor should it be put in the ship refrigerator, as this is entirely unnecessary. It is not necessary to use any hygroscopic chemical for the assumed purpose of maintaining a dry atmosphere within the containers; indeed this is a dangerous and messy procedure.

If negative film is specially packed by the manufacturer for export and care is exercised in transporting, no fear need be maintained for its safe keeping qualities.

Par-speed negative film specially packed for me by the Eastman Kodak company, as described, has kept in perfect condition for over two years and withstood varying changes of temperature and conditions of travel through Central Africa, India and around the world on my various expeditions, without any loss.

Another item to be noted in taking motion picture film as baggage is that all ports of England prohibit any motion picture film being brought into England as baggage and regulations there impose a large fine for offenders. This does not refer to the question of custom duties, but is an arbitrary rule against entering England with motion picture film as any type of baggage, either hand baggage or in trunks. The only way to avoid trouble at an English port is to list the film cases on your steamer as ship's cargo and have it placed on the ship's manifest. The fact that film is "left in bond" in a port does not affect this rule. This rule does not exist in any other country but applies to all ports of the British Isles.

U. S. Duty

All film, whether manufactured in the United States or not, is subject to a custom duty charge upon return to the United States if it has been exposed abroad.

Care should be exercised to avoid taking film through several foreign countries in baggage as custom duties are demanded in each country. Few foreign countries have arrangements for baggage to be checked through transit "inbound," and demand that custom duties be paid on a "refund basis." Such procedure takes months of delay and is decidedly impractical. Films should therefore be shipped direct to the nearest shipping point to destination whenever possible.

Under conditions customarily encountered in local transportation where goods are transported upon backs of coolies, pack animals, etc., they are subjected to considerable jolting as well as changes of temperature and weather.

During the rough travel the third or larger units should be protected by wrapping, with both a straw-matting and a cheap waterproof cloth tied with rope. In the absence of straw-matting it is well to use the cheap red cotton blankets, obtainable in the native bazaars, as an inside wrapping. These coverings serve as protection against vibration, moisture and extreme heat.

In extremely hot climates, like Central Africa, and on long marches in the sun, the waterproof should be wrapped inside and the package kept cool by occasionally wetting the outside straw-matting cover. The rapid evaporation keeps the temperature down. Care should be exercised to see that porters do not leave their loads containing these units directly in the sunshine unnecessarily for long periods during the heat of the day.

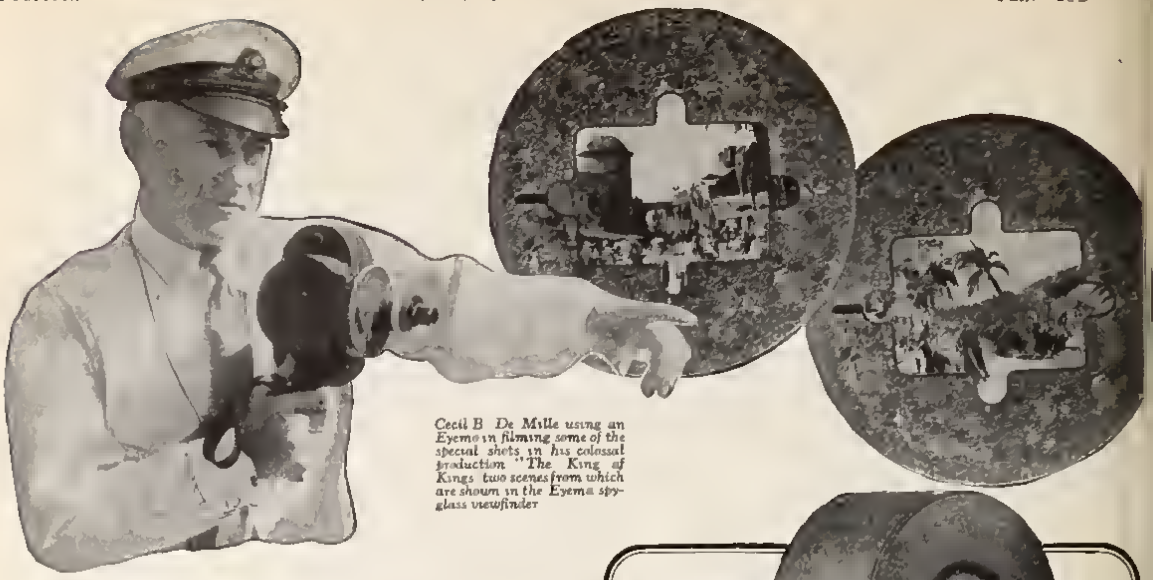
II. After Opening—Before Exposure

NEGATIVE film should not be rewound before using in the camera if it can possibly be avoided, as the emulsion thereby absorbs moisture from the atmosphere during the re-winding. This also allows foreign matter, such as very fine dust to settle and adhere to the surface as a consequence of the electrification of the film during re-winding and this will ultimately cause minute spots of the picture after exposure. Also "static markings" are likely to result from friction that is developed in the re-winding operation.

Open at Night

Open only one of the third or larger unit containers at a time, carefully protecting the contents from moisture. The best time to open these units is at night when it is often cooler than during the day. Heat has considerable effect on the film emulsion in the presence of moisture, so that changing in a moist atmosphere should be avoided whenever possible.

(Continued on Page 19)



Cecil B De Mille using an Eyemo in filming some of the special shots in his colossal production "The King of Kings" two scenes from which are shown in the Eyemo spy-glass viewfinder

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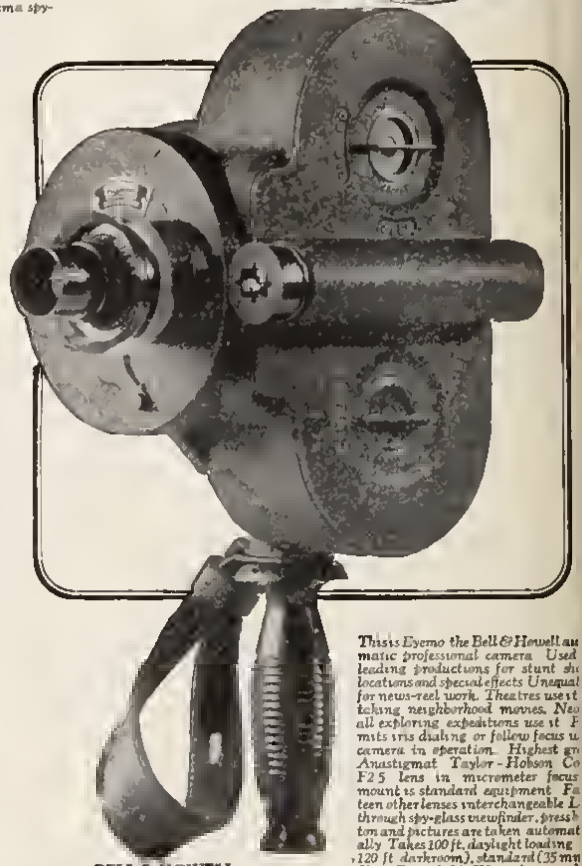
Complete information on the Bell & Howell Cameras shown here will be mailed upon request.



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AMATEUR CINEMATOGRAPHY

(Continued from Page 8)

dium glass and emerging into the same medium that lies in front of the lens and which we suppose to be air.

The symbols and signs expressed in the figure correspond to the chosen convention, and the reader is requested to familiarize himself with this mode of reading and expressing optical values.

The Convention is as follows:

I· The point of intersection of the first refracting surface with the axis, is the origin from which the reckoning commences.

II· Media are denoted by odd numbers; surfaces of separation by even numbers.

In Fig. 19 the first medium, air, is distinguished by the sign −1; the medium, glass, by the sign +1; the medium, air into which the ray emerges, by the sign +3.

The first surface (facing the incident light) is denoted by 0, and the second surface of the lens by 2.

III· The direction which the light travels, is reckoned as positive and the opposite direction as negative, and so are *length* measured along the axis, or parallel to it.

In Fig. 19, the direction A V_0 is reckoned as *positive,* and the direction A′ V_2 as *negative.*

IV· Lengths perpendicular to the axis, are positive when they lie above the axis, and *negative,* when below it.

In Fig. 19, h_0, is *positive.*

V: Radii of curvature are *positive* when the surface presents its convex face toward the incident light, and *negative* if the surface is concave to the incident light.

In Fig. 19, the radius r_0 is *positive* and the radius r_2, is *negative.*

VI: Thicknesses are regarded as being always *positive.* In Fig. 19, the thickness d_1 is *positive.*

VII: Constants—Constants are indicated by *small italic letters.*

In Fig. 19, the letters n and n' indicate respectively the medium air and the medium glass. When various lenses made of different glasses are combined to form a single optical whole, the letter n is used to indicate the glass of weakest refraction, the letter n' indicates the next stronger, n'', the next, and so on.

The numerical suffixes at the right lower side of the letters indicate the medium to which the letter refer, and if an alphabetical suffix is found at the left lower side, it indicates the corresponding Fraunhofer line.

In Fig. 19, the symbol

$$^{n}_{D}+1,$$

indicates the index of refraction corresponding to the D line (Sodium line) for a first refracting medium.

VIII: Points—The position of *points,* is indicated by *capital* letters, and are distinguished by numerical suffixes, of the corresponding refracting surfaces.

In Fig. 19, V_0 indicates the vertex of the first refracting surface of the lens, and C_2, the center of curvature of the second surface of the lens.

IX: Lengths are indicated by *small italic letters,* and

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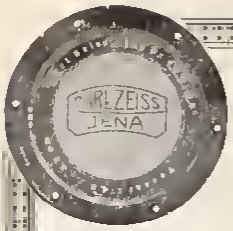

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are distinguished by numerical suffixes, corresponding to the characteristic of the lens, to which they refer.

In Fig. 19, d_1 indicates the thickness of a first refracting medium; a_0, the distance from the point A, to the vertex V_0.

X' Angles are indicated by small *Greek letters.* (Note: In the course of these articles, heavy type, small Roman characters, will be used instead of Greek letters.)

In Fig. 19, the letter a denotes the angle which the incident ray makes with the axis.

The *positive* and *negative* values of angles will be explained as the occasion presents itself.

To summarize let us suppose the following formula:

$$n_{-1} = 0.0092$$
$$n_{+1} = 1.5$$
$$n_{+3} = 0.0092$$
$$r_0 = 60 \text{ millimeters}$$
$$r_2 = 50 \text{ millimeters}$$
$$d_1 = 10 \text{ millimeters}$$

It indicates a double convex lens of crown glass whose index of refraction is 1.5, placed in air (Index 0.0092) the radius of the first face having a length of 60 millimeters and the radius of the second face a radius of 50 millimeters. The thickness of the lens being 10 millimeters.

It is evident that such formula gives all specifications of the lens in question, and all of its characteristics may be found by geometrical construction, or trigonometrical computation.

ERRATA

In "A Professional's Notes for Amateurs" last month (May), paragraph four, column two, page four, should hvae read as follows:

"CROWN GLASS in a compound of Silica and Lime and Soda, or Potash or both.

"FLINT GLASS is a compound of Silica and LEAD, with Soda or Potash or both."

(To be Continued Next Month)

To Transfer Film Library from New York to Hollywood

Walter A. Futter, president of Wafilms, Inc., is in Hollywood for the purpose of making arrangements for the transfer of his film stock from New York city to Hollywood.

Besides maintaining an extensive library, Futter is the producer of a number of short subjects, including "Curiosities.

* * *

Joseph A. Dubray, A. S. C., has completed the photography on "Snowbound," a Tiffany production. The cast included Betty Blythe, Lillian Rich, Robert Agnew, George Williams, Harold Goodwin, Pat Harmon, George Fawcett and Martha Mattox.

* * *

At the open meeting of the American Society of Cinematographers, held on May 16, Glen Gano of the research department of Creco, Inc., spoke on practical phases of panchromatic film. Gano's talk was illustrated by lantern slides.

GRAININESS

(Continued from Page 10)

a minimum of graininess can be produced by employing contrasty lighting for the subject and developing to a low degree of development.

In case the lighting of the object is not subject to control and if development must be forced, the borax developer above will give a minimum of graininess.

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(To be Continued Next Month)

CLEANING LIQUIDS

(Continued from Page 11)

above solution but the results indicated that these are usually not necessary.

An alternative method of moistening the film is to first ride in the presence of water was investigated further by exposing mixtures prepared with the different alcohols to ultra violet light. In the case of mixtures of tetrachloride and water with denatured alcohol and isopropyl alcohol, the image was attacked in eight hours. No effect was obtained with a mixture containing tertiary butyl alcohol after exposure for 24 hours.

Of the combined cleaning and moistening liquids tested, the following was the most satisfactory:

Carbon tetrachloride	10 parts by volume
Water	20 parts by volume
Tertiary butyl alcohol	to 100 parts by volume

This has no harmful effect on the film, it dissolves a sufficient quantity of mineral oil and it humidifies the gelatin coating. If it is necessary to increase the quantity of water in the formula, the proportion of the ingredients to give a clear solution is indicated by the miscibility curve in Figure 1.

The capacity of the unused liquid for dissolving mineral oil is limited, but with use the liquid will dissolve a greater proportion of oil as a result of dehydration of the liquid by virtue of the absorption of water by the gelatin of the film. Unless the liquid is used for long periods it is usually not necessary to add a further quantity of water to compensate for that absorbed by the film.

If the film to be cleaned is coated with an excess of oil the above solution may not entirely remove all the oil with one treatment and a second treatment may be necessary.

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Experiments have been made with the addition of remove the oil with carbon tetrachloride and then give the film a second treatment with a mixture of denatured alcohol or tertiary butyl alcohol and water in the proportions outlined above. This involves more labor but is a very satisfactory procedure.

Practical Recommendations

1. For cleaning the base side of negative and positive film after processing the following solution is recommended:

Ammonia (Cone.)	5 parts by volume
Water	95 parts by volume
Alcohol* to make	1000 parts by volume

*The "Pyro" brand of denatured alcohol of the Industrial Alcohol Company is satisfactory, although isopropyl alcohol or tertiary butyl alcohol are to be preferred.

The solution may be applied to positive film by means of a cleaning machine and to negative film when wound face down onto a cloth covered drum. Negative film may be cleaned with safety on certain types of sprocketless cleaning machines, but it should not be handled on machines with sprockets owing to the possibility of damage to the film.

2. In order to remove dust and finger markings from negative film it should be cleaned before printing by wiping gently with silk plush moistened with carbon tetrachloride (sulphur-free) as it is being wound on a rewinder. An electric fan should be arranged so as to blow a current of air across the film in a direction away from the face of the operator. The cleaning process should be repeated after every third or fourth print has been made.

3. For cleaning film which has accumulated oil and dirt during projection, carbon tetrachloride (sulphur-free) as supplied by the Dow Chemical Co., is recommended. For cleaning brittle film the following solution at the same time removes oil and moistens the film, thus tending to restore its flexibility.

Carbon tetrachloride	10 parts by volume
Water	20 parts by volume
Ter butyl alc to make	100 parts by volume

The quantity of water in this formula should be varied according to conditions. If the film is too moist after treatment less water should be used in the formula and if too brittle more water should be added. In this case it will be necessary to increase the quantity of alcohol also so as to retain the water in solution.

The cleaning liquid may be applied to the film in the same manner as outlined under (2) above. This method is not always satisfactory because if the solvent does not evaporate thoroughly before the film is rewound, more or less solvent is retained between the convolutions of the film and in case an impure solvent is used this will be liable to attack the film image on storage. A film cleaning machine of the type recommended by Faulkner[2] is to be preferred.

In the case of very brittle film two successive applications may be necessary. The odor of tertiary butyl alcohol may also be objectionable in hot weather.

An alternative procedure is to first remove oil from the film with pure carbon tetrachloride and then moisten the film by passing through a mixture of denatured alcohol, isopropyl alcohol, or tertiary butyl alcohol with 15% to 25% of water.

Although air which contains sufficient carbon tetrachloride to smell perceptibly, is not dangerously toxic, ample ventilation should be supplied when using this or any other solvent. In the case of a film cleaning machine, a suitable exhaust hood with carry-off pipes should be arranged over the machine.

Carbon tetrachloride as received in drums often contains a small quantity of water in suspension as fine droplets. Unless the water is removed before use, spots will be left on film after cleaning as a result of local swelling of gelatin by the water.

The water can be removed readily by pouring the liquid through a vertical glass tube containing granules of anhydrous calcium chloride. A tube four or five feet long, three or four inches wide, and fitted with an outlet tube above one-half inch in diameter is satisfactory. A wad of absorbent cotton at the bottom of the tube serves to retain the calcium chloride granules.

To use the column the carbon tetrachloride is poured in at the top and allowed to run out at the bottom directly into the dispensing bottle which has been dried previously. Several gallons can be passed through the apparatus in a few minutes. The calcium chloride should be thrown away and replaced occasionally. Usually several hundred gallons can be treated with the quantity described above. Both ends of the tube should be stoppered when the apparatus is not in use, otherwise the calcium chloride will absorb moisture from the atmosphere.

FILM CARE IN TROPICS

(Continued from Page 13)

As soon as the film has been taken from the inner first unit or original container, as it was sealed by the manufacturer, it begins to spoil at a rapid pace and continues to do so until it is exposed and developed. Thus care should be exercised not to load film into the camera magazine any earlier in advance of use than necessary. A good spacious light-tight changing bag such as the "Ingento" is most essential forth is purpose and will allow for quick loading of the film rolls into magazines just prior to use as well as temporary repacking very soon thereafter.

The greatest dangers to be avoided after loading in the magazine are the absorption of moisture from the air and friction from transport vibration. The film is naturally free in the camera magazine and although wound tightly in a roll to exclude all possible air from entering when packed, as soon as the tension of the wrapping is removed it will "loosen up" in the roll. This "loosening up" allows access of atmospheric moisture and heat to the emulsion surface and at the same time the coiled layers of film slide from side to side upon each other, thereby developing minute friction markings. This is, of course, true both before and after exposure.

Film loaded in magazines and transported for some time in motor cars over rough roads and on trains invariably loosens up and develops minute friction or "rain streaks" from vibration.

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This trouble can be considerably lessened by stuffing the black paper, in which the film is originally wrapped, inside the camera magazine so as to wedge the film roll tightly and thus prevent "loosening-up," but, of course, the black paper must be removed from the magazine by the use of a light-tight hand changing bag before use in the camera.

It is also advisable to use paper to wrap camera magazines loaded with film, when they are not sure to be used the same day as loaded, to prevent moist air from passing into the magazine both before and after exposure.

When working near salt water additional precautions against exposure to the atmosphere should be taken owing to a more rapid deterioration of the film emulsion from contact with the chemicals which are carried in suspension in the air.

III. Exposure in the Camera

CORRECT exposure in the camera depends, in a large measure, on the approximate time interval that must elapse before development. If the film is to be developed in the field shortly after exposure, say one to two weeks, normal exposure is sufficient and there is no definite rule for an increased exposure ratio in anticipation of delayed development.

Exposure meters are invaluable as a basis for ascertaining the correct exposure for immediate development but no allowance is made for the lapse of time during a delayed development interval.

IV. After Exposure and Before Development

After negative film has been exposed in the camera, it should be repacked with black paper and taped in the original first unit container, as soon as possible without rewinding. Often it is not practicable to do this packing with the necessary thoroughness during field operations. The films must then be placed temporarily in the tins until a dark room is available and a number of exposed rolls have been accumulated; also to wait for a drier condition of the atmosphere.

The thorough final packing of negative film after exposure referred to above, for delayed development and transport, should be conducted in a dark room if possible, although it can be done in a light-proof changing bag. The old black wrapping paper, wooden spool or core, and tape, which came in the original package, should be entirely discarded and fresh black photographic wrapping paper and fresh adhesive tape used. Never use newspaper or any kind of wrapping paper other than black photographic wrapping paper to repack film, as most paper contains chemicals injurious to the sensitive film.

Flame of Candle

The original containers should be well dried out with the flame of a candle to remove all moisture. The film spool must be drawn as tightly as possible without "pulling" and wrapped tightly with the new black paper. After placing the film inside the dried container, the center opening and every possible space available, is filled tightly with dry, fresh, black paper. When the

cover is placed on the container under pressure, it should exclude all possible air from the container, and a double wrapping of new tape should be tightly drawn around the cover edges to seal the container. The tape should then be sealed over with a coating of hot paraffin wax, for which purpose melted candle wax will serve very effectively.

The original container should then be replaced in the inside second unit containers, in the same manner, after which the film is ready for shipment to the laboratory for development.

All of the same precautions as mentioned under "care before exposure" should be even more carefully observed after exposure, as the film is now more susceptible to injury than before exposure.

Field Development

It is more practical to utilize the delayed development method of operation than to attempt field development of motion picture film except at considerable expense, and by expert handling. Developing motion picture negative film by the use of portable equipment in the field requires considerable care and skill, but, whenever possible, it is advisable to develop short test strips to determine the correct exposure; which exposure can then be increased for delayed development.

**See "The Handling of Motion Picture Film at High Temperatures," by J. I. Crabtree.*

Trans. S. M. P. E., Vol. 19, p. 39.

"The Development of M. P. Film by the Reel and Tank System," by J. I. Crabtree.

Trans. S. M. P. E., Vol. 16, p. 163.

(Continued from Page 5)

some of the European productions, the fact is clearly established at last, I believe, that it is the all-powerful medium through which a picture must rise or fall. The director who used the camera in such a way as to merely transfer the convential stage to the screen—with all of the legitimate's direct and inflexible angles—has long since become obsolete. The more thoroughly a director knows the camera, the better chance he has to succeed as a director.

¶ "It is my belief that the producers recognize this fact more than ever before. Therefore, I further believe that within the next couple seasons, a substantial number of cinematographers will win deserved promotions to the posts of directors.

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PROJECTION-Conducted by Earl J. Denison

Projection in Foreign Houses

By Daniel B. Clark, A.S.C.

President of A.S.C. Speaks of Experiences of Members Who Visit Foreign Theatres

A. S. C. members whose travels take them to every corner of the globe come in contact with every variety of motion picture theatre. While their chief duties of course are the photographing of films in whatever clime they may be sojourning, they have a natural interest in the manner in which the native exhibitors are presenting American pictures; hence, time permitting, it is not long before they are making friends with the exhibitors, about whose methods and problems they learn much.

Projection System

Possibly the first thing which comes to their attention, once the exhibitor has shown them about his plant, is the system of projection employed in a given location.

And what systems they encounter!

Obsolete

In the finer houses of the larger cities, they of course find projection layouts as modern as those used in similar American establishments. But in far too many instances, obsolete types of projectors, much the worse for wear, are still being pressed into service after years of negligence and extremely rough usage.

Similar Cases

The result is much the same as is experienced, sad to relate, in some American houses. The audience views an imperfectly rendered picture which does violence to the efforts of all those who were connected with its making and distribution—the old, old story. Even the most cursory analysis will show that such a situation produces no benefits in a market—foreign distribution—from which a great portion of the profits of American productions should be derived.

Needless Cost

Furthermore, there is the item of the physical damage to the film itself, as caused by the imperfect action of the out-of-date projection equipment. This works a cost of many thousands of dollars which should otherwise be saved.

"Picture Wise"

From the standpoint of the foreign exhibitor, it does not seem logical that he should be indifferent to the excellencies of film presentation. It is true enough that many of the foreign audiences are satisfied with any type of picture just so long as it moves, but it is as true of these assemblages, as it has been proved of those in the United States, that they inevitably will become "picture wise"—which will mean that the quality of presentation must be improved or patronage will fall off.

Creating New Patrons

Keeping a theatre filled up is something of an educational process. It seems less likely in the foreign fields, than in any others, that the point of saturation should set in among theatre-goers—the point where the old law of diminishing returns sets in. What these exhibitors need to do is to convert more people, who have never acquired the habit of attending motion pictures, into confirmed theatre-goers. This is worthy promotion work. The task then is not only to hold old patrons but to create new ones.

Where to Begin

And one of the most basic places to start in such a constructive program is in the projection room. Why, it is said that some of these houses, which are supposed to be superlative in their particular localities, maintain but one projector, when it now has become the accepted practice, for ideal exhibitions, to have no less than three.

What these men need to do is to give thought to their projection—its quality, its working units, and how these units are working. If new equipment is needed, the best investment in the world is to buy it—for, after all, it means future dollars and cents at the box office.

The Editor of "Better Theaters"—Exhibitor's Herald

RECOMMENDS THREE PROJECTORS

The recommendation to have three machines is a good one and we understand that some of the largest circuits are standardizing on three projectors in the projection room.

HARRY E. HOLQUIST
Editor,
Better Theaters

The best in projection facilities and equipment are none too good for the exhibitor who would please his patrons. Projection deserves foremost consideration.

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Cameras Invade Alaska for Klondike Gold Rush Picture

Batteries of cameras are "grinding" on the Chilkoot Pass, White Horse Rapids and frozen lakes of the Klondike region, filming outdoor scenes in the original locales for "The Trail of '98," Metro-Goldwyn-Mayer's forthcoming epic of the Gold Rush, based on Robert W. Service's novel.

While Clarence Brown is directing interiors with Dolores Del Rio, Ralph Forbes, Harry Carey and others, Harry Schenck, one of his technical assistants, is at work with a crowd of extras in the Klondike. The picture, it is stated, will be even larger than "Ben-Hur," with thirty-seven principals and 15,000 extra players.

John F. Seitz, A. S. C., is chief cinematographer on the Brown picture. Faxon Dean, A. S. C., is among the cinematographers who are in Alaska.

Lon Chaney Stars in Film Made by Amateur Methods

Lon Chaney is star, director, cameraman, scenarist and title writer of his latest film—an entirely one-man affair.

It will never be seen by the public—only by his friends. Chaney, who is an amateur movie camera enthusiast, staged a little scenario of his own during his vacation, with Mrs. Chaney and his son, Creighton, as a supporting cast. He wrote his own titles and cut the picture himself.

Refrigerators Used to Keep Film on Desert Location

Refrigerators had to be imported into the Mojave desert to film the outdoor sequences of Lillian Gish's Metro-Goldwyn-Mayer vehicle, "The Wind." The temperature ran to 125, so refrigerators were shipped in, the films taken from the camera and stored next to ice, and the pictures saved. The new picture is an adaptation of Dorothy Scarborough's romance of Texas, with Lars Hanson and a notable cast directed by Victor Seastrom.

Read the

American Cinematographer

for Constructive and Profitable Projection Policies

"CHANG"

and the

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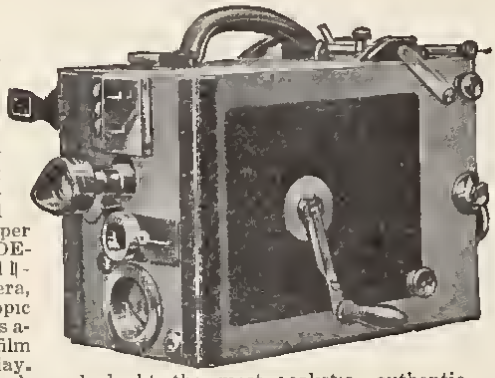

"Chang"—the new film thriller made in Northern Siam by Mr. Ernest B. Schoedsack and M. C. Cooper with a "DEBRIE" all-metal camera, is the one topic of conversation in film circles today. "Chang" is beyond doubt the most realistic, authentic, thrilling melodrama of jungle life ever filmed. Mr. Schoedsack has this to say about the film—and the "DEBRIE" camera:

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Whitman to Direct Sennett Comedies

Philip H. Whitman, A. S. C., has begun the direction of comedies at the Mack Sennett Studios, Hollywood.

For the past several months, Whitman has been a member of the Sennett scenario staff, having co-directed on a number of the short subjects.

His promotion to full directorship comes as a reward of his splendid services with the Sennett organization, with which he gained his first experience as a cinematographer.

In the cinematographic field Whitman is noted as a master of trick and intricate camera work, having at various times done special photographic assignments with Universal, Douglas Fairbanks, Cosmopolitan and the Long Island plant of Famous Players-Lasky. It was on the completion of his contract with the latter studio that the A. S. C. member came west to enter the scenario department at Sennett's.

* * *

George Schneiderman, A. S. C., has completed the photographing of Fox's "Colleen," which Frank O'Connor directed.

* * *

Alfred Gilks, A. S. C., has finished the shooting of "Ten Modern Commandments," which Dorothy Arzner directed for Paramount.

* * *

Victor Milner, A. S. C., has returned to Hollywood from Oakland, where he took location scenes for a current Paramount production.

* * *

Joseph A. Dubray, A. S. C., has begun the filming of his latest Tiffany production.

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*Page 209, "A Million and One Nights, the History of the Motion Picture"—by Terry Ramsaye.

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